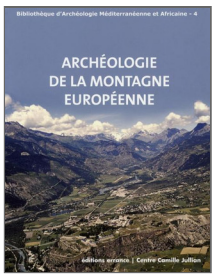

Stéfan Tzortzis et Xavier Delestre (dir.)

Archéologie de la montagne européenne
Actes de la table ronde internationale de Gap, 29 septembre-1er octobre 2008

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A plea for a (New) Environmental Archaeology : the use of the geographical historical microanalitical approach in mountain areas of NW Italy

Pour une archéologie des ressources de l'environnement de montagne : l'apport de la microanalyse historique et géographique du site

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DOI: 10.4000/books.pccj.214
Publisher: Publications du Centre Camille Jullian, Éditions Errance
Place of publication: Aix-en-Provence
Year of publication: 2010
Published on OpenEdition Books: 13 February 2020
Serie: Bibliothèque d'archéologie méditerranéenne et africaine
Electronic ISBN: 9782957155736

OpenEdition books

http://books.openedition.org

Printed version
Date of publication: 1 June 2010

Electronic reference
MORENO, Diego ; et al. *A plea for a (New) Environmental Archaeology : the use of the geographical historical microanalitical approach in mountain areas of NW Italy* In: *Archéologie de la montagne européenne: Actes de la table ronde internationale de Gap, 29 septembre-1er octobre 2008* [online]. Aix-en-Provence: Publications du Centre Camille Jullian, 2010 (generated 03 avril 2020). Available on the Internet: <http://books.openedition.org/pccj/214>. ISBN: 9782957155736. DOI: https://doi.org/10.4000/books.pccj.214.

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A plea for a (New) Environmental Archaeology: the use of the geographical historical microanalitical approach in mountain areas of NW Italy

Diego MORENO*, Carlo MONTANARI*, Anna Maria STAGNO*, Chiara MOLINARI*

Abstract. Here are proposed different studies carried out by the Laboratorio di Archeologia e Storia Ambientale of Genoa University through the use of a geographical historical microanalitical approach to documentary, field and sedimentary sources. The main aim is the reconstruction of different agri-silvo-pastoral practices and of environmental processes connected to the management of mountain resources widespread in the past in the Eastern Ligurian Apennines and now completely disappeared. In particular, we focused our attention on one of the access points to pastoral resources of the upper Aveto valley connected to transhumance systems involving mainly sheep until the end of 19th century. This study was carried out in the perspective of the identification of different agri-silvo-pastoral practices concerning the common-land use system since the 16th century. In this particular case, the comparison of different sources allowed the reconstruction of the relationship between settlement development, environmental resources management systems and the abandonment of these practices.

Pour une archéologie des ressources de l'environnement de montagne : l'apport de la microanalyse historique et géographique du site

Résumé. Sont ici exposés différents cas d'étude conduits par le Laboratorio di Archeologia e Storia Ambientale de l'Université de Gênes avec l'apport de la microanalyse historique et géographique du site. Le but principal de notre groupe est la reconstruction de différentes pratiques agro-selvi-pastorales et de procès liés à la gestion des ressources de l'environnement de montagne sur les Apennins de la Ligurie orientale durant les époques passées. Nous avons en particulier focalisé notre attention sur le hameau rural de Ventarola, un des points d'accès aux ressources pastorales de la haute vallée d'Aveto en lien avec le système de transhumance principalement dédié aux ovins jusqu'à la fin du XIXe s. Cette étude a été conduite dans la perspective d'une identification de différentes pratiques agro-selvi-pastorales qui ont alimenté un usage de terre commune depuis le XVIe s. Dans ce cas particulier, le croisement de différentes sources a permis de reconstruire les relations existantes entre le développement de l'agglomération, le système de gestion des ressources environnementales et les effets induits par l'abandon de ces pratiques de gestion.

1. Introduction

Since its foundation (1995), the Laboratorio di Archeologia e Storia Ambientale (L.A.S.A., Di.SMeC. - Dip.Te.Ris.) has involved a group of researchers and teachers of both the Faculties of Humanities and of Sciences at Genoa University. Presently it is mainly concerned with the activities of the Doctoral School of *Historical Geography for the Valorisation of Historical and Environmental Heritage*, and many local, national and European research projects are in progress.

Each project is based on many different types of evidence: written and oral sources, archaeological excavation and survey, sedimentary investigations (geoarchaeological, archaeobotanical, archaeozoological) and *in-site* and *extra-site* historical ecology analysis of existing landscapes.

The study of past dynamics and functions affecting the environmental resource ecology is the main focus of the teamwork. Our perspective starts from the standard field techniques of palaeoecology and aims to develop methods based on the analysis of precise local case studies at a topographical scale that can suggest a more complex historical generalisation. In our view, dynamics and modelling of resources systems need a high resolution *geographical historical microanalytical approach* to the sites for producing and employing field evidences. The main methodological

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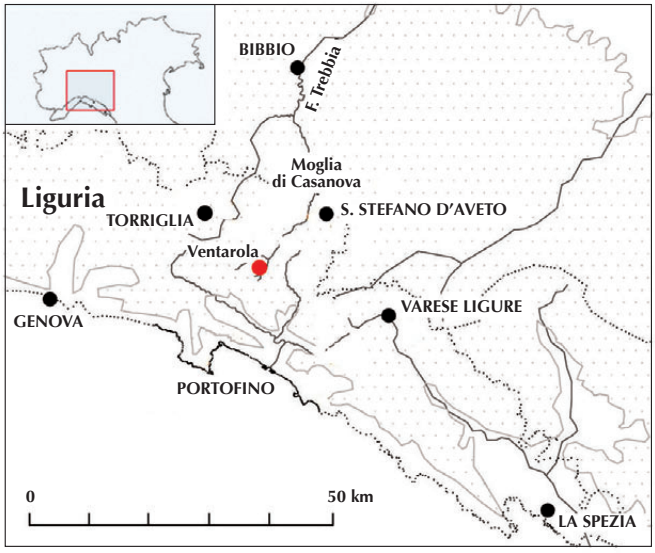

Fig. 1. Ventarola hamlet localization.

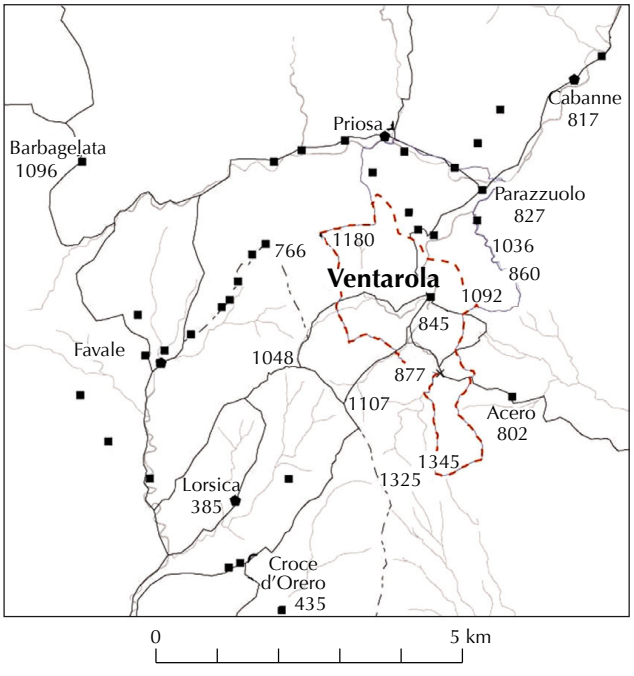

Fig. 2. Ventarola hamlet "boundaries" in 1822.

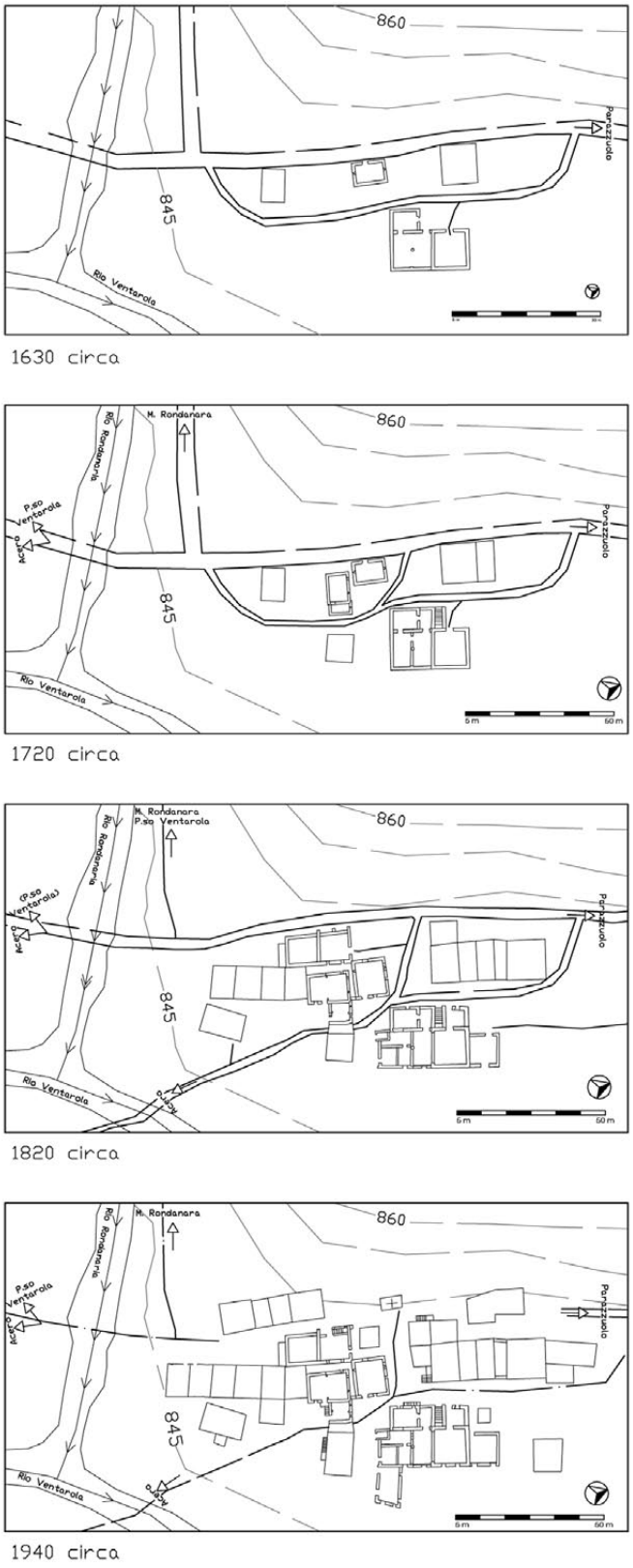

Fig. 3. Ventarola hamlet and road transformations between 1630 ca. and 1940 ca.

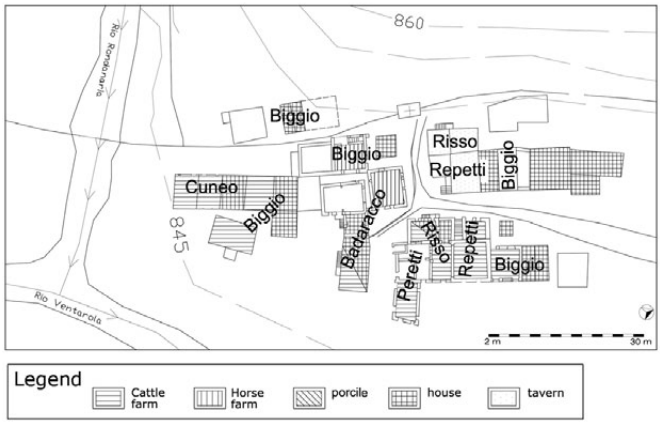

Fig. 4. Ventarola hamlet. Chronology of the construction of livestock spaces (stables and hay-barns) documented for 1870. The last modification is considered for restored buildings.

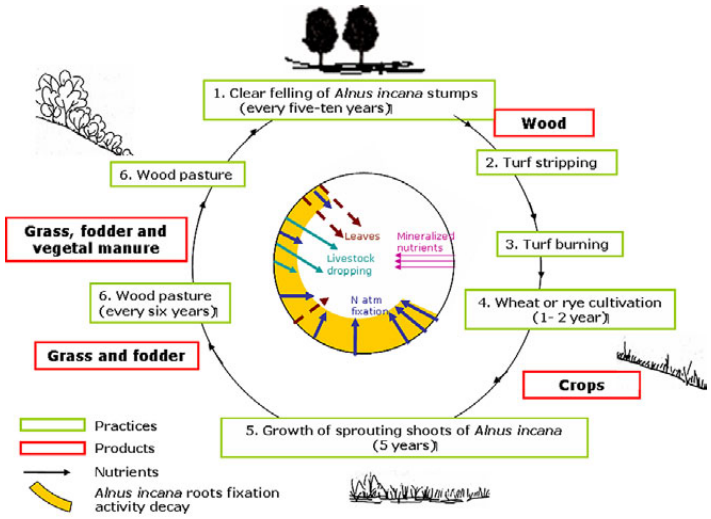

Fig. 5. Prevailing economic products (in the outer circle), management practices (in the middle circle) and nutrient sources/ecological basis (in the inner circle) in the *"alnocoltura"* cycle according to 1820 *Consegne dei Boschi* and to 1896 *Relazioni* (after Moreno *et al.* 1998).

features of this approach can be listed as follows: 1) re-examining the importance of interdisciplinary fieldwork; 2) combining present local environmental knowledge and outside (academic) knowledge; 3) pointing out the crucial role of different (and changing) management and activation practices on the ecology of environmental resources; 4) adopting a regressive method in the historical approach to the different sources; 5) producing high resolution studies on sedimentary evidence (pollen, charcoal, etc.); 6) combining archaeological survey with vertical stratigraphy for the study of standing rural buildings (and ruins); 7) cross-comparing evidences and contextualization of textual and iconographical evidences.

The choice of a detailed scale of reconstruction of historical management and activation practices allows the identification of the processes which have produced past cultural (rural) landscapes and exploring the historical relationship with the related rural settlement distribution.

Researches carried on by our group deal mainly with the Western Apennines, but a number of different sites of interest are distributed in the North Western Italian Mountain area, reaching the Maritime Alps (Cevasco, Poggi 1999; 2000; Maggi *et al.*, 2006; Moreno 1997; Moreno, Cevasco 2006; Moreno *et al.,* 1992; 2004; 2005).

2. Ventarola case study

Ventarola (Rezzoaglio, Genoa) is a mountain hamlet (today composed by seven houses, two of them still inhabited) located at about 845 m a.s.l. in the upper Aveto valley (Eastern Ligurian Apennines, Northern Italy, fig. 1).

This rural hamlet is one of the widespread nucleated settlements in Eastern Ligurian mountain areas (referred as

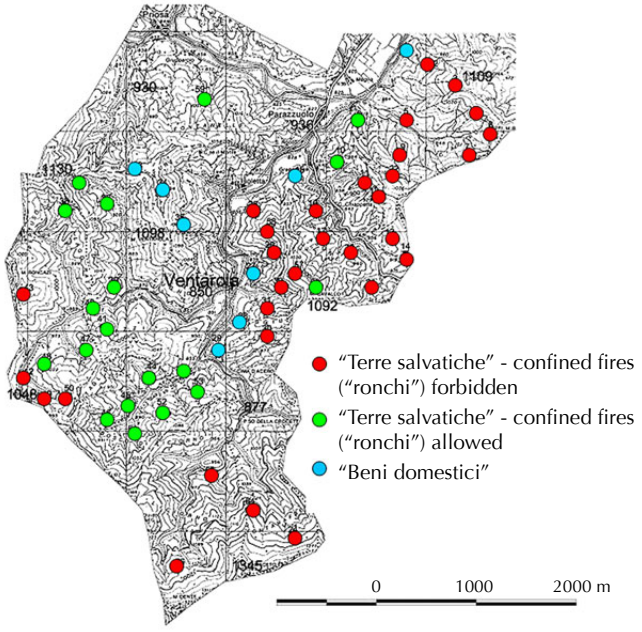

Fig. 6. Localization of parcels where, according to *Relazioni* of 1720, confined fires were forbidden or allowed (after Cevasco *et al.* 2008).

ville in post-medieval texts, Scarin 1957, Raggio 1990). As testified by cartographical and textual documentation, during the past Ventarola was an important access point to the upper Aveto Valley, within a network of commercial and transhumance routes linking coastal winter pastures of Riviera di Levante to mountain summer pastures of the Po valley (fig. 2).

Today the area is part of the Aveto Regional Natural Park. For what concerns climatic and geological features, the climate is sub-oceanic, the mean 2006 temperature is 9.8ºC and the annual rainfall is 1351 mm p.a. (as recorded at the Santo Stefano d'Aveto meteorological station, APAT 2007). The local bedrock consists mainly of sandstone, fine limestone, marlstone and clayey schists[1].

The present vegetation of the area is characterized by coppiced mixed woodlands, mainly dominated by turkey oak (*Quercus cerris* L.) and beech (*Fagus sylvatica* L.). Cultivated fields, meadows and wooded-pastures are present in the surroundings of the hamlet, while alders (*Alnus glutinosa* (L.) Gaertner) and willows (*Salix caprea* L.) grow around wetlands.

The study of the Ventarola rural settlement started as a rescue archaeological campaign carried out since 2005 in the frame of the restoration of one of the hamlet buildings, in order to obtain a new hiking refuge for the Aveto Regional Natural Park[2]. These investigations showed that part of the transformations documented in the building (dated to 1630 A.D.) were due to inner social changes affecting the rural families that used (or held) the dwellings. Moreover, they seem also in connection with general changes affecting agri-silvo-pastoral practices in which the settlement and this building were involved (Cevasco *et al*. 2008). After this first campaign, the research has developed, by means of a multidisciplinary approach, into a micro-analytical study focused on the reconstruction of the functional organization of the productive space inside and outside the hamlet. The relationships between the settlement and the agri-silvo-pastoral resources management (system of practices) carried out since the 16th century onwards were also investigated.

During 2007, the archaeological investigation was extended on the standing walls of the hamlet buildings to better understand different transformations documented during the rescue campaign, and to validate them in the rural peopling geography perspective: individual strategies were distinguished from changes related to the whole hamlet (inhabitants collectivity). Historical cartographical and archival analyses were focused on changes of vegetation between the 18th and 20th century. In this case, a specific interest was lead to the transformations of environmental resources management and to changes in the use of spaces by inhabitants of Ventarola through time. This method also allowed validating the archaeological approach to the reconstructive analysis of the building (Stagno in press). The outcomes of the archaeological research have been compared with those from bio-stratigraphic evidence. In particular, palynological analyses conducted on a soil profile from the surroundings of the Ventarola hamlet clearly showed the strict correlation between environmental resources management, rural buildings (space distribution) and changes of vegetation cover (Molinari, Stagno 2009).

2.1. Archaeological investigations

Archaeological investigations were conducted with the methodology of architecture archaeology (stratigraphic analysis of the standing walls and configurational analysis, Mannoni 1984, 1998) on the hamlet buildings and allowed to underline different periods of settlement development.

In order to date the walls, a chrono-typology of doors and windows was defined on the base of the presence of dated doors and on the comparison with other previous archaeological studies on buildings in Eastern Liguria.

Hypotheses on functions and changes of buildings spaces were based on the characteristic of the last function at present recognizable. Moreover, by comparing dimensions and distribution of rooms, doors and windows, a grid of interpretation was built for the use of spaces through time.

The results hypothesized that since the end of 15th century a number of the documented transformations could have been connected to general changes affecting local agri-silvo-pastoral practices.

The study of this settlement's transformations, in connection with modifications of the road network, showed that during the 18th and the first half of the 19th century Ventarola was transformed from a scattered (1630) into a linear nucleated settlement. Since the second half of 19th century a disjointed hamlet has developed, by constructing buildings in all direction (fig. 3). These changes were probably due to the progressive decrease of Ventarola road network importance during the 19th century, that also induced the decrease of inhabitant number, as testified by archival documents. For these reasons it can be argued that the "economic success of Ventarola" was fed by social and geographical long-distance relationships, connected to trades, seasonal migrations and to transhumance systems. For what concerns the stabling structures, archaeological investigations underlined the first occurrence, at the beginning of the 19th century, of a clear differentiation among houses and spaces

1. Regione Liguria, Carta Geologica Regionale, scala 1:25 000, 2006.
2. DOCUP Obiettivo 2 (2000-2006), "attività di supporto alla gestione ambientale",- componente b, "realizzazione della Rete Natura 2000" "Parco dell'Aveto e Rete Natura 2000: boschi e biodiversità".

devoted to the livestock and a general increase of hay-barns (both dimensionally and numerically, fig. 4).
In buildings used only for stabling and feeding animals (locally called *cascine*) the new stables have windows instead of slits used formerly; at the first floor there is a hay-barn with a lot of windows and an external door for the hay transportation, as previously. Since this period, the construction of the second floor for the old buildings was documented and the new buildings were constructed with three floors. Such variations could be correlated to a change from a transhumant sheep-goat breeding to a resident bovine breeding[3] (and consequent need of more space) and to a change from a multiple to a monocultural management system of agri-silvo-pastoral resources. During the rescue campaign, the construction of a pebble floor with drainage system, serving the two livestock shelters, was documented at the end of the 18th century. A similar pebble floor is also found in another stable built in the same period. It is not clear if the "drainage system" is a solution adopted in all hamlet stables: if it is true, the shift of stables to the south-eastern part of the hamlet, near the rivers, during the 19th century, could be explained.

2.2. Historical ecology, cartographical and documentary sources

In order to study the composition, structure and ecological function of *Alnus incana* (L. Moench) actual plots in the upper Aveto valley, previous researches were carried out by L.A.S.A. teamwork, based on historical ecology investigations, archival documents and historical cartographical studies.
Through these researches (Bertolotto, Cevasco 2000a; 2000b; Moreno *et al*. 1998; Cevasco 2007) a particular local type of multiple agricultural practice called *ronco* was documented in this area, between the 18th and the 19th century (and now completely disappeared). This system is part of a cyclical soil workmanship for cereals seeding (rye and oat) through the use of controlled fire in woodland and shrubland parcels populated by alder (and for this reason called *alnocoltura*, fig. 5). Soil fertilization of the parcel was due to grazing and to the particular fertilizing capacity of alder (Daniere *et al*. 1986).
For the reconstruction of different local practices involved in this common-land use system during the 18th century, a series of six manuscript topographical maps drawn between 1714 and 1726 by Marc'Antonio Fossa (a judge acting as agent in the mountain estates of the Doria-Pamphilj seigneurial family) were analysed. The richness of place-names and the detailed description annexed to each map (*Relazione*) allowed to document the permission or prohibition to make *ronchi* (*roncare*) at the level of the individual properties (*terreno*) of each *villa* (Cevasco, Tigrino 2008). The information collected from these maps, once plotted on a GIS platform, allowed to localize each site with the indication of *ronco* on a recent topographical map. Moreover, the comparison between these maps and a woodland enquiry promoted by Regno di Sardegna *(Consegne dei Boschi*)[4] underlined that between 1720 and 1822 Ventarola agricoltural system was based on the division between *beni domestici* (subjected to permanent cultivation) and *terre salvatiche* (forested, grazed, temporarily cultivated with different practices of *ronco* (including the *alnocoltura*) and almost covered with scattered trees [fig. 6]).
After that, in order to point out the most important vegetation and land use changes between the 18th and the 19th century, the methodology of the so called "cartographic filtration" on a GIS platform was employed. This method consists in a comparison among a series of cartographic documents from the same area in different periods[5] (fig. 7a, b, c, d).
As it can be seen from the maps, the most important change between the 1818 *Minute di campagna* and the 1854 *Gran Carta degli Stati Sardi di Terraferma* consists in the representation of most of the parcels with scattered trees into woodlands. In these maps it is not possible to recognize the *alnocoltura* sites, while the space devoted to permanent grassland and pasture is evident. This could be a first trace of an agro-sylvi-pastoral resource management transformation, from a multiple to a monocoltural system. This element can be connected to the increase of space devoted to haybarns, also documented during archaeological investigations.
In the 1936 map the increase of open areas is probably connected to the cattle breeding expansion, while the 1999 map documents a post-cultural situation, with the spreading of woodlands as a consequence of the abandonment of agro-sylvi-pastoral practices.

2.3. Biostratigraphical analysis

In the frame of previous historical ecology and environmental archaeology investigations, the possibility to identify in a pollen diagram some traces of the local agro-sylvi-pastoral

3. This transformation was documented during the same period in the nearby Fontanabuona Valley and in the "Montagna di Fascia" near Genoa city (Moreno 1990, p. 116-119).

4. Archivio di Stato di Genova, *Prefettura Sarda*, pacco 207, *Consegne dei boschi e foreste, mandamento di S. Stefano d'Aveto*, 1822-1824.

5. In particular, for the reconstruction of Ventarola "agricultural system" the following sequence of maps have been employed: *Minute di campagna* (1818), scale 1:9450; *Gran Carta degli Stati Sardi di Terraferma* (1854), scale 1:50.000; Istituto Geografico Militare, F. 83NE, Favale di Malvaro (1936), scale 1:25.000; Carta Tecnica Regionale (1999–2000), scale 1:10.000.

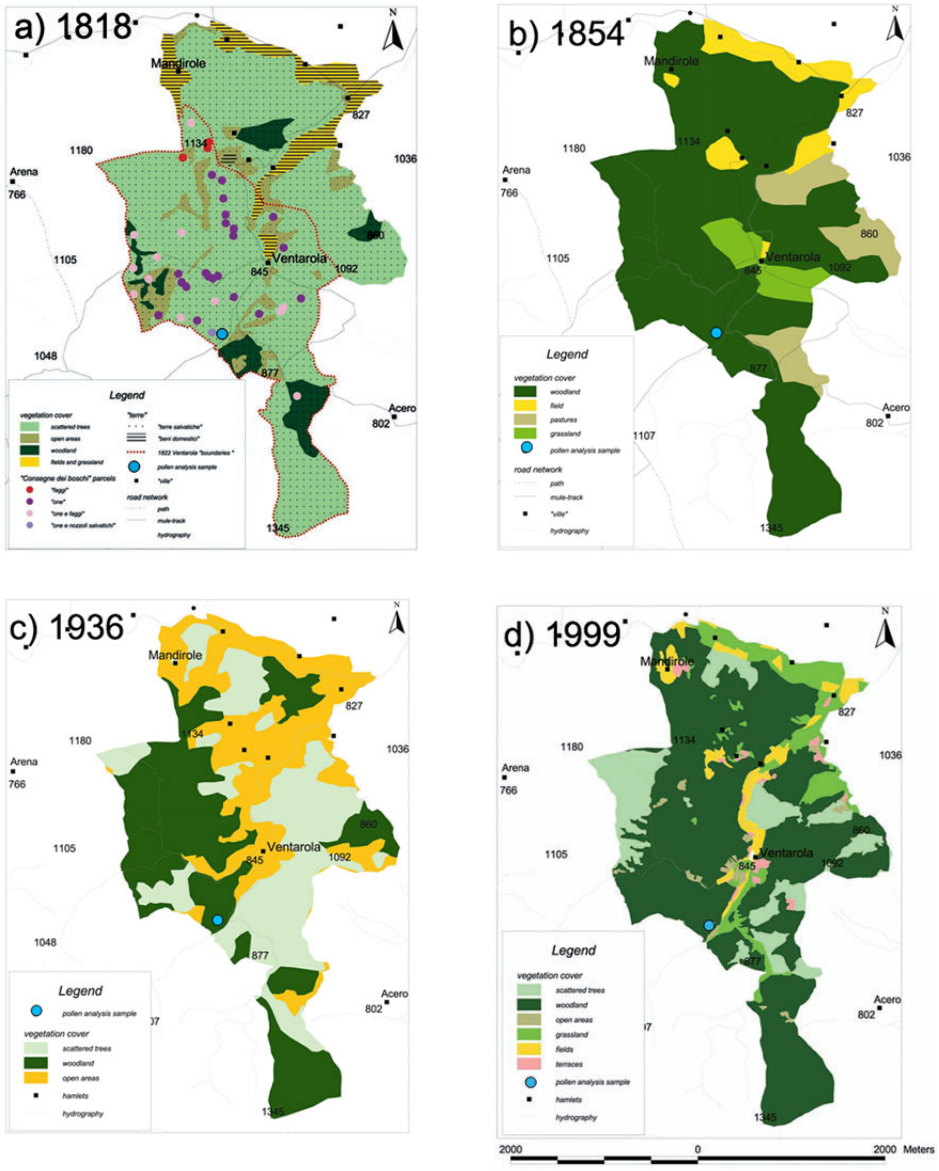

Fig. 7. a-d). Maps outcome from the cartographic filtration.

practices in which the settlement and the surrounding areas were involved through time has been tested.

For this reason, in November 2007 a soil profile 40 cm deep was sampled every 5 cm in a historically documented site of *alnocoltura* in the surroundings of Piaggia di San Rocco, at 867 m a.s.l. (UTM: 4922409N; 0524510E), close to the rural hamlet of Ventarola (fig. 8a, b). Today the sampled parcel is an abandoned coppiced alder wood, mixed with turkey oaks (*Quercus cerris* L.) and hawthorns (*Crataegus monogyina* Jacq.). The herb layer is characterised by bracken (*Pteridium aquilinum* (L.) Kuhn) and bramble (*Rubus hirtus* W. et K.). Wooded pastures are present in the surroundings.

Lithology, stratigraphy and Munsell soil colors of the different layers of the soil profile were described in the field. Sub-samples of 2 cm^3 were taken for pollen and microcharcoal analysis throughout the soil profile and one surface moss sample was collected and analyzed for the study of the recent pollen rain[6]. Soil pH (H_2O) was measured with standard technique (Thunjai, Boyd 2001).

According to Davidson *et al*. (1999), despite problems due to bioturbation, percolation, preservation and anthropogenic disturbance, pollen assemblages in soils can be useful indicators for environmental and land-use reconstruction

6. *Lycopodium* tablets were added to the samples (Stockmarr 1971), which were processed using standard laboratory preparation (Moore, Webb, Collinson 1991). Pollen grains and spores were identified with a binocular microscope at 400 x magnification and a minimum of 200 pollen grains (due to their low concentration) was counted at each level. Nomenclature follows Reille (1992). The number of micro-charcoal fragments bigger than 10 µm was counted in the slides prepared for pollen analysis.

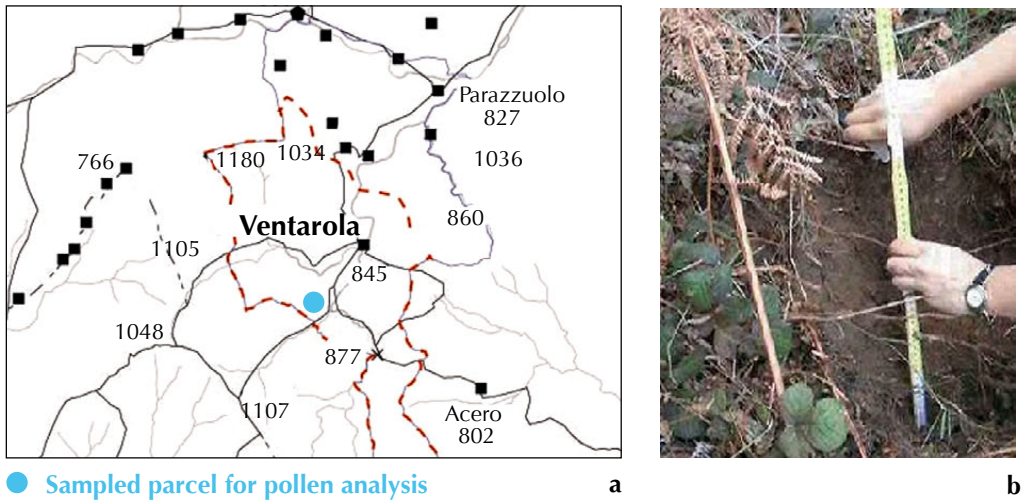

Fig. 8. a) Localization of the parcel sampled for pollen analysis and b) picture of the soil profile.

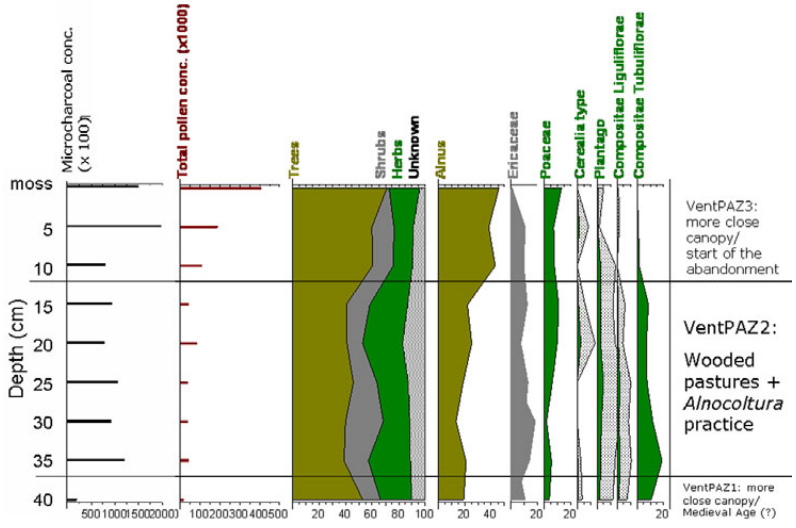

Fig. 9. Synthetic pollen diagram showing the most important taxa characterizing vegetation composition dynamics and land-use changes near Ventarola during the time period recorded.

from small, defined catchments at least over the last few centuries. Although different opinions on soil palynology, Dijkstra & van Mourik (1995) and Segerström (1991) stressed that pollen extracted from acid forest soils can be stratified and provide a record of vegetation history.

At the Ventarola site, pollen data suggest that a sort of stratigraphy of the acid brown/light yellowish brown soil analyzed can be assumed. At the moment, the lack of radiocarbon dating prevents a chronologically control. However, the presence of some pollen markers, together with historical and archaeological information, allowed an indirect dating of the pollen diagram.

The diagram has been divided into three pollen zones on the base of the most important vegetation and land-use changes (fig. 9).

In particular, in the more ancient pollen zone, palynological data show a quite open arboreal canopy dominated by *Alnus*, while Ericaceae (mainly *Erica*) and Compositae tubuliflorae, followed by Poaceae undiff. represent the non arboreal pollen component. The steady presence throughout the profile of quite high percentages undifferentiated pollen grains, could be due to an high soil oxidation which causes degradation of botanical plant remains (Dimbleby 1957). In spite of the current lack of radiocarbon dating, according to the presence of *Abies* (still persistent locally within the Liguria mountains in the Middle Ages, Macphail 1988, Branch 2004, Gentile *et al.* 1988, Lowe *et al.* 1994), and to the low microcharcoal concentration (suggesting the absence of any form of burning practices), this phase could be set at the Medieval times.

In the second phase, the landscape is even more open and it is dominated by non-arboreal components, suggesting the presence of wooded-pastures with scattered trees. The higher and quite constant microcharcoal concentration indicates an increased use of fire, probably connected to the spreading of temporary agricultural practices (*ronchi*), testified by the archival documents between 1720 and 1822. Due to the *Alnus* dominance (but with moderate percentages showing the absence of a forest cover), the practice of the *alnocoltura* can be argued. Another possible indicator of the use of this particular system is testified by the presence of taxa connected to mowing, grazing and cultivation practices (Behre 1986; Hjelle 1998, 1999). The increase of *Calluna* and *Erica* could be due to their greater spreading after fires, but also to the fact that Ericaceae are normally favored by mowing.
Finally, the most recent zone of the pollen diagram, in accordance with the historical cartography, shows a post-cultivation picture, with the progressive closure of the forest canopy due to the abandonment of temporary agricultural practices, also testified by the lower microcharcoal concentration in the first part of this phase.

2.4. Conclusion

Reconstructing techniques for the exploitation of environmental resources, even not far in the past, it is always difficult and complex. Nonetheless, documentary or observational sources can be hard to decipher singularly. Therefore, a multidisciplinary approach, according to the method of historical ecology, can result successful.
In this case, encouraging results have been obtained by matching, the results of building archaeology and soil pollen analysis, in a historical frame based upon documentary sources.
Different kind of sources that singularly could seem inadequate, when put together can allow a more precise description of the past management of the environmental resources. Actually, it has been pointed out the strict correlation between changes in vegetation cover, modifications in the past management practices and variations in exploiting buildings and in the organization of small rural settlements.

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